1995 Index of Articles

Volume XXXVIII

Journal of the Institute of Environmental Sciences

SUBJECT INDEX

CONTAMINATION CONTROL (CC)

Cleanroom Design/Materials

Rational Vibration and Structural Dynamics Evaluations for Advanced Technology Facilities, Kenneth Medearis, V. 38, No. 5, p. 35.

Cleanroom Operation/Procedures

Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, Robert G. Knollenberg, Brett T. Haley, and David E. Steidtmann, V. 38, No. 6, p. 18.

Particle Fallout in a Class 100,000 High-Bay Aerospace Cleanroom, Sally M. Peters, V. 38, No. 4, p. 15.

SEMATECH Minienvironment Benchmarking Project, Laura B. Rothman, Robert J. Miller, Richard D. Wang, Tim Baechle, Steve Silverman, and Douglas Cooper, V. 38, No. 3, p. 36.

Criteria and Standards

Assessing Requirements for Wafer Environment Control, William Fosnight, David L. Jensen, and Ray Martin, V. 38, No. 6, p. 30.

ASTM E 1559 Method for Measuring Material Outgassing/ Deposition Kinetics, J.W. Garrett, A.P.M. Glassford, and J.M. Steakley, V. 38, No. 1, p. 19.

Department of Defense Use of Military and Commercial Standards: Clarification of Issues, Walter Bergmann II, V. 38, No. 1, p. 6.

Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, P.D. Kinney, D.Y.H. Pui, B.Y.H. Liu, T.A. Kerrick, and D.B. Blackford, V. 38, No. 2, p. 27.

Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, R. Periasamy, D.S. Ensor, A.C. Clayton, R.P. Donovan, and J. Riddle, V. 38, No. 1, p. 29

Update on DoD Reform Initiative: Where Do We Stand on Specifications and Standards?, Walter B. Bergmann II, V. 38, No. 6, p. 36.

Filters and Filtration

Filtration of Real-World Particles in Liquids by Microporous Membrane Filters, Jae-Keun Lee, Benjamin Y.H. Liu, Kenneth L. Rubow, and Seong-Ho Yoo, V. 38, No. 3, p. 19.

Identification, Measurement, and Monitoring

A Comparison of Commercial Cleanroom Wiping Materials for Properties Related to Functionality and Cleanliness, J. Marshall Oathout and Charles F. Mattina, V. 38, No. 1, p. 41.

Assessing Requirements for Wafer Environment Control, William Fosnight, David L. Jensen, and Ray Martin, V. 38, No. 6, p. 30.

ASTM E 1559 Method for Measuring Material Outgassing/ Deposition Kinetics, J.W. Garrett, A.P.M. Glassford, and J.M. Steakley, V. 38, No. 1, p. 19.

Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, Robert G. Knollenberg, Brett T. Haley, and David E. Steidtmann, V. 38, No. 6, p. 18.

Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, P.D. Kinney, D.Y.H. Pui, B.Y.H. Liu, T.A. Kerrick, and D.B. Blackford, V. 38, No. 2, p. 27.

Gaseous Contaminant Measurement for Semiconductor Processing by Diode Laser Spectroscopy, James J.F. McAndrew, Ronald S. Inman, and Benjamin Jurcik, V. 38, No. 5, p. 22.

Lower Detection Limit of Aerosol Particle Counters, Benjamin Y.H. Liu, Seong-Ho Yoo, and Seung-Ki Chae, V. 38, No. 4, p. 31.

Partial Pressure Analysis in Space Testing, Charles R. Tilford, V. 38, No. 3, p. 30.

Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, R. Periasamy, D.S. Ensor, A.C. Clayton, R.P. Donovan, and J. Riddle, V. 38, No. 1, p. 29.

Permeation of Moisture and Oxygen Through Polymeric O-Rings, Ce Ma, Eric Shero, Nishith Verma, Stephen L. Gilbert, and Farhang Shadman, V. 38, No. 2, p. 43.

Modeling and Simulation

A Numerical Study of Indoor Contaminant Mixing, C.R. Buchanan, I.P. Chung, and D. Dunn-Rankin, V. 38, No. 5, p. 15.

Assessing Requirements for Wafer Environment Control, William Fosnight, David L. Jensen, and Ray Martin, V. 38, No. 6, p. 30.

Sources and Effects

A Comparison of Commercial Cleanroom Wiping Materials for Properties Related to Functionality and Cleanliness, J. Marshall Oathout and Charles F. Mattina, V. 38, No. 1, p. 41.

1995 Index of Articles

Volume XXXVIII

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CONTAMINATION CONTROL (CC)

Cleanroom Design/Materials

Rational Vibration and Structural Dynamics Evaluations for Advanced Technology Facilities, Kenneth Medearis, V. 38, No. 5, p. 35.

Cleanroom Operation/Procedures

Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, Robert G. Knollenberg, Brett T. Haley, and David E. Steidtmann, V. 38, No. 6, p. 18.

Particle Fallout in a Class 100,000 High-Bay Aerospace Cleanroom, Sally M. Peters, V. 38, No. 4, p. 15.

SEMATECH Minienvironment Benchmarking Project, Laura B. Rothman, Robert J. Miller, Richard D. Wang, Tim Baechle, Steve Silverman, and Douglas Cooper, V. 38, No. 3, p. 36.

Criteria and Standards

Assessing Requirements for Wafer Environment Control, William Fosnight, David L. Jensen, and Ray Martin, V. 38, No. 6, p. 30.

ASTM E 1559 Method for Measuring Material Outgassing/ Deposition Kinetics, J.W. Garrett, A.P.M. Glassford, and J.M. Steakley, V. 38, No. 1, p. 19.

Department of Defense Use of Military and Commercial Standards: Clarification of Issues, Walter Bergmann II, V. 38, No. 1, p. 6.

Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, P.D. Kinney, D.Y.H. Pui, B.Y.H. Liu, T.A. Kerrick, and D.B. Blackford, V. 38, No. 2, p. 27.

Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, R. Periasamy, D.S. Ensor, A.C. Clayton, R.P. Donovan, and J. Riddle, V. 38, No. 1, p. 29

Update on DoD Reform Initiative: Where Do We Stand on Specifications and Standards?, Walter B. Bergmann II, V. 38, No. 6, p. 36.

Filters and Filtration

Filtration of Real-World Particles in Liquids by Microporous Membrane Filters, Jae-Keun Lee, Benjamin Y.H. Liu, Kenneth L. Rubow, and Seong-Ho Yoo, V. 38, No. 3, p. 19.

Identification, Measurement, and Monitoring

A Comparison of Commercial Cleanroom Wiping Materials for Properties Related to Functionality and Cleanliness, J. Marshall Oathout and Charles F. Mattina, V. 38, No. 1, p. 41.

Assessing Requirements for Wafer Environment Control, William Fosnight, David L. Jensen, and Ray Martin, V. 38, No. 6, p. 30.

ASTM E 1559 Method for Measuring Material Outgassing/ Deposition Kinetics, J.W. Garrett, A.P.M. Glassford, and J.M. Steakley, V. 38, No. 1, p. 19.

Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, Robert G. Knollenberg, Brett T. Haley, and David E. Steidtmann, V. 38, No. 6, p. 18.

Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, P.D. Kinney, D.Y.H. Pui, B.Y.H. Liu, T.A. Kerrick, and D.B. Blackford, V. 38, No. 2, p. 27.

Gaseous Contaminant Measurement for Semiconductor Processing by Diode Laser Spectroscopy, James J.F. McAndrew, Ronald S. Inman, and Benjamin Jurcik, V. 38, No. 5, p. 22.

Lower Detection Limit of Aerosol Particle Counters, Benjamin Y.H. Liu, Seong-Ho Yoo, and Seung-Ki Chae, V. 38, No. 4, p. 31.

Partial Pressure Analysis in Space Testing, Charles R. Tilford, V. 38, No. 3, p. 30.

Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, R. Periasamy, D.S. Ensor, A.C. Clayton, R.P. Donovan, and J. Riddle, V. 38, No. 1, p. 29.

Permeation of Moisture and Oxygen Through Polymeric O-Rings, Ce Ma, Eric Shero, Nishith Verma, Stephen L. Gilbert, and Farhang Shadman, V. 38, No. 2, p. 43.

Modeling and Simulation

A Numerical Study of Indoor Contaminant Mixing, C.R. Buchanan, I.P. Chung, and D. Dunn-Rankin, V. 38, No. 5, p. 15.

Assessing Requirements for Wafer Environment Control, William Fosnight, David L. Jensen, and Ray Martin, V. 38, No. 6, p. 30.

Sources and Effects

A Comparison of Commercial Cleanroom Wiping Materials for Properties Related to Functionality and Cleanliness, J. Marshall Oathout and Charles F. Mattina, V. 38, No. 1, p. 41.

Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, Robert G. Knollenberg, Brett T. Haley, and David E. Steidtmann, V. 38, No. 6, p. 18.

Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, R. Periasamy, D.S. Ensor, A.C. Clayton, R.P. Donovan, and J. Riddle, V. 38, No. 1, p. 29.

Particle Fallout in a Class 100,000 High-Bay Aerospace Cleanroom, Sally M. Peters, V. 38, No. 4, p. 15.

Permeation of Moisture and Oxygen Through Polymeric O-Rings, Ce Ma, Eric Shero, Nishith Verma, Stephen L. Gilbert, and Farhang Shadman, V. 38, No. 2, p. 43.

DESIGN, TEST, AND EVALUATION (DTE)

Acoustics

Static and Dynamic Calibration of Pressure Transducers at Elevated Temperatures, David Banaszak and Michael P. Camden, V. 38, No. 4, p. 23.

Automotive/Transportation

Life Prediction and Damage Acceleration Based on the Power Spectral Density of Random Vibration, Jimmy M. Hu, V. 38, No. 1, p. 34.

On-Site Prediction of Overstress in an Aircraft Munitions Carrier, Lindsay Yowell and William H. Connon III, V. 38, No. 3, p. 26.

Vibration Qualification of Commercial Computers for Use in Military Tactical Environments, John v. Dente, James L. McCutcheon, and Dr. Ashok K. Jain, V. 38, No. 4, p. 18.

Climatics and Thermal

Physics-of-Failure: An Approach to Reliable Product Development, Michael Pecht and Abhijit Dasgupta, V. 38, No. 5, p. 30.

Static and Dynamic Calibration of Pressure Transducers at Elevated Temperatures, David Banaszak and Michael P. Camden, V. 38, No. 4, p. 23.

The ESS Muddle: Physics vs. Relics, Hank Caruso, V. 38, No. 2, p. 21.

Criteria and Standards

ASTM E 1559 Method for Measuring Material Outgassing/ Deposition Kinetics, J.W. Garrett, A.P.M. Glassford, and J.M. Steakley, V. 38, No. 1, p. 19.

Department of Defense Use of Military and Commercial Standards: Clarification of Issues, Walter Bergmann II, V. 38, No. 1, p. 6.

MIL-STD-810E: Significant Changes Included in Notice 3, Herb Egbert and Hank Caruso, V. 38, No. 4, p. 10.

Rational Vibration and Structural Dynamics Evaluations for Advanced Technology Facilities, Kenneth Medearis, V. 38, No. 5, p. 35.

Swept Sine Vibration Test Conservatism, M.J. Hine, V. 38, No. 6, p. 13.

Update on DoD Reform Initiative: Where Do We Stand on Specifications and Standards?, Walter B. Bergmann II, V. 38, No. 6, p. 36.

Shock and Vibration

Enhanced Multiaxis Vibration Control Using a Robust Generalized Inverse System Matrix, Jeffrey N. Fletcher, Håvard Vold, and Mark D. Hansen, V. 38, No. 2, p. 36.

Life Prediction and Damage Acceleration Based on the Power Spectral Density of Random Vibration, Jimmy M. Hu, V. 38, No. 1, p. 34.

On-Site Prediction of Overstress in an Aircraft Munitions Carrier, Lindsay Yowell and William H. Connon III, V. 38, No. 3, p. 26.

Rational Vibration and Structural Dynamics Evaluations for Advanced Technology Facilities, Kenneth Medearis, V. 38, No. 5, p. 35.

Swept Sine Vibration Test Conservatism, M.J. Hine, V. 38, No. 6, p. 13.

The ESS Muddle: Physics vs. Relics, Hank Caruso, V. 38, No. 2, p. 21.

Vibration Qualification of Commercial Computers for Use in Military Tactical Environments, John v. Dente, James L. McCutcheon, and Dr. Ashok K. Jain, V. 38, No. 4, p. 18.

Solar and Space Simulation

ASTM E 1559 Method for Measuring Material Outgassing/ Deposition Kinetics, J.W. Garrett, A.P.M. Glassford, and J.M. Steakley, V. 38, No. 1, p. 19.

Partial Pressure Analysis in Space Testing, Charles R. Tilford, V. 38, No. 3, p. 30.

Particle Fallout in a Class 100,000 High-Bay Aerospace Cleanroom, Sally M. Peters, V. 38, No. 4, p. 15.

Test Tailoring

Life Prediction and Damage Acceleration Based on the Power Spectral Density of Random Vibration, Jimmy M. Hu, V. 38, No. 1, p. 34.

MIL-STD-810E: Significant Changes Included in Notice 3, Herb Egbert and Hank Caruso, V. 38, No. 4, p. 10.

Swept Sine Vibration Test Conservatism, M.J. Hine, V. 38, No. 6, p. 13.

The ESS Muddle: Physics vs. Relics, Hank Caruso, V. 38, No. 2, p. 21.

Test Time Compression

Life Prediction and Damage Acceleration Based on the Power Spectral Density of Random Vibration, Jimmy M. Hu, V. 38, No. 1, p. 34.

PRODUCT RELIABILITY (PR)

Acquisition Policies

Department of Defense Use of Military and Commercial Standards: Clarification of Issues, Walter Bergmann II, V. 38, No. 1, p. 6.

Update on DoD Reform Initiative: Where Do We Stand on

Specifications and Standards?, Walter B. Bergmann II, V. 38, No. 6, p. 36.

Criteria and Standards

Department of Defense Use of Military and Commercial Standards: Clarification of Issues, Walter Bergmann II, V. 38, No. 1, p. 6.

MIL-STD-810E: Significant Changes Included in Notice 3, Herb Egbert and Hank Caruso, V. 38, No. 4, p. 10.

Update on DoD Reform Initiative: Where Do We Stand on Specifications and Standards?, Walter B. Bergmann II, V. 38, No. 6, p. 36.

Durability/Fatigue

Life Prediction and Damage Acceleration Based on the Power Spectral Density of Random Vibration, Jimmy M. Hu, V. 38, No. 1, p. 34.

On-Site Prediction of Overstress in an Aircraft Munitions Carrier, Lindsay Yowell and William H. Connon III, V. 38, No. 3, p. 26.

Physics-of-Failure: An Approach to Reliable Product Development, Michael Pecht and Abhijit Dasgupta, V. 38, No. 5, p. 30.

Stress Screening

Physics-of-Failure: An Approach to Reliable Product Development, Michael Pecht and Abhijit Dasgupta, V. 38, No. 5, p. 30.

The ESS Muddle: Physics vs. Relics, Hank Caruso, V. 38, No. 2, p. 21.

AUTHOR INDEX

B

Baechle, T., SEMATECH Minienvironment Benchmarking Project, V. 38, No. 3, p. 36. (Abstract—see Rothman, L.B.)

Banaszak, D., Static and Dynamic Calibration of Pressure Transducers at Elevated Temperatures, V. 38, No. 4, p. 23. *The Air Force conducts tests requiring measurement of high dynamic pressures in high-temperature environments. Such tests require the measurement of dynamic pressures created by jet engines, turbulent airflow along hot areas of aircraft structures, and acoustic levels in Air Force test chambers such as acoustic chambers, wind tunnels, and engine test stands. Dynamic pressure transducers were evaluated for use in extreme acoustic and thermal environments. Transducer manufacturers were surveyed and three off-the-shelf pressure transducers capable of measuring dynamic pressures at extreme environments were identified. This paper describes procedures used to calibrate these transducers up to a 172-dB sound pressure level and a temperature of 732°C (1350°F). The results are summarized for different static pressures, operating SPLs, and temperatures.* (DTE: Acoustics, Climatics and Thermal)

Bergmann II, W.F., Department of Defense Use of Military and Commercial Standards: Clarification of Issues, V. 38, No. 1, p. 6. *This report is an excerpt from a special Standardization Newsletter published in the Fall of 1994. It clarifies the issues related to the implementation of the Perry Memorandum.* (CC: Criteria and Standards; DTE: Criteria and Standards; PR: Acquisition Policies, Criteria and Standards)

Bergman II, W.F., Update on DoD Reform Initiative: Where Do We Stand on Specifications and Standards?, V. 38, No. 6, p. 36. *This speech was presented during a panel discussion on "The Demise of Military Standards" which was held at the 1995 Annual Technical Meeting of the Institute of Environmental Sciences in Anaheim, California.* (CC: Criteria and Standards; DTE: Criteria and Standards; PR: Acquisition Policies, Criteria and Standards)

Blackford, D.B., Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, V. 38, No. 2. p. 27. (Abstract—see Kinney, P.D.)

Buchanan, C.R., A Numerical Study of Indoor Contaminant Mixing, V. 38, No. 5, p. 15. *Indoor air quality depends on the concentration and distribution of airborne contaminants. Often these are not uniform throughout the environment because the inlet air may not mix completely with the room air to dilute contaminants, which can be the result of poor room design or nonequilibrium conditions. The structure of the airflow and the extent of contaminant mixing depends on the locations of flow and contaminant sources and sinks, as well as the geometric barriers in the room. This paper describes a three-dimensional numerical simulation of the transport and dispersion of a passive, airborne contaminant in which the Navier-Stokes and concentration equations are solved under transient conditions for a rectangular enclosure with a single ventilation inlet and outlet. This investigation focuses on the effects of flow obstructions and ventilation rates on contaminant mixing.* (CC: Modeling and Simulation)

C

Camden, M.P., Static and Dynamic Calibration of Pressure Transducers at Elevated Temperatures, V. 38, No. 4, p. 23. (Abstract—see Banaszak, D.)

Caruso, H., MIL-STD-810E: Significant Changes Included in Notice 3, V. 38, No. 4, p. 10. (Abstract—see Egbert, H.)

Caruso, H., The ESS Muddle: Physics vs. Relics, V. 38, No. 2, p. 21. *This paper examines the history and evolution of environmental stress screening (ESS) to show how uncoordinated initiatives from each military service contributed to the current state of disarray in the ESS community. The lack of a common vision for ESS is examined as a continuing handicap in efforts to integrate ESS more fully into the hardware development process. Common areas of confusion regarding effective ESS procedures and facilities are discussed, including: temperature air change rate vs. hardware thermal response; the number of vibration axes needed; simultaneous vibration in combined axes vs. sequential vibration in each; and pneumatic vs. electrodynamic vibration facilities. A "checklist" of considerations to apply in developing a successful ESS program is pre-*

*sented. (*DTE: Climatics and Thermal, Shock and Vibration, Test Tailoring; PR: Stress Screening)

Chae, S.-K., Lower Detection Limit of Aerosol Particle Counters, V. 38, No. 4, p. 31. (Abstract—see Liu, B.Y.H.)

Chung, I.P., A Numerical Study of Indoor Contaminant Mixing, V. 38, No. 5, p. 15. (Abstract—see Buchanan, C.R.)

Clayton, A.C., Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, V. 38, No. 1, p. 29. (Abstract—see Periasamy, R.)

Connon III, W.H., On-Site Prediction of Overstress in an Aircraft Munitions Carrier, V. 38, No. 3, p. 26. (Abstract—see Yowell, L.)

Cooper, D., SEMATECH Minienvironment Benchmarking Project, V. 38, No. 3, p. 36. (Abstract—see Rothman, L.B.)

D

Dasgupta, A., Physics-of-Failure: An approach to Reliable Product Development, V. 38, No. 5, p. 30. (Abstract—see Pecht, M.)

Dente, J.V., Vibration Qualification of Commercial Computers for Use in Military Tactical Environments, V. 38, No. 4, p. 18. *Commercial computers are generally designed for commercial use and lack industry specifications for tactical use, other than the shipping environment. To use commercial computers in rugged military tactical environments, appropriate mounting trays and fixtures with vibration isolators must be designed for installation in tactical wheeled and tracked vehicles. This paper describes the vibration test profiles used in testing a commercial computer and monitor, as isolated, to determine the survivability limitations of these components when subjected to simulated tactical wheeled and tracked vehicle vibration environments.* (DTE: Automotive/Transportation, Shock and Vibration)

Donovan, R.P., Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, V. 38, No. 1, p. 29. (Abstract—see Periasamy, R.)

Dunn-Rankin, D., A Numerical Study of Indoor Contaminant Mixing, V. 38, No. 5, p. 15. (Abstract—see Buchanan, C.R.)

E

Egbert, H., MIL-STD-810E: Significant Changes Included in Notice 3, V. 38, No. 4, p. 10. *On June 7, 1995, the Defense Standards Council agreed that MIL-STD-810 should be converted to a Test Method Standard. In an effort to facilitate its application and granting of waivers, Change Notice 3 to MIL-STD-810E was prepared. Included in this report are some of the more significant corrections included in Notice 3.* (DTE: Criteria and Standards, Test Tailoring; PR: Criteria and Standards)

Ensor, D.S., Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, V. 38, No. 1, p. 29. (Abstract—see Periasamy, R.)

F

Fletcher, J.N., Enhanced Multiaxis Vibration Control Using a Robust Generalized Inverse System Matrix, V. 38, No. 2, p. 36. *Multiaxis vibration control as a means to recreate service stress in the laboratory has achieved a great deal of success in the last decade. While initial applications centered around components and assemblies requiring a relatively few number of points (1 to 4), current applications such as a full-vehicle simulation may require 12 or more exciters. This paper discusses the development and application of a new robust control technique that decreases operator interaction while improving control accuracy.* (DTE: Shock and Vibration)

Fosnight, W., Assessing Requirements for Wafer Environment Control, V. 38, No. 6, p. 30. *A methodology for assessing Wafer Environment Control (WEC) needs based on process specific defect density (D_o) goals, actual process and airborne particle levels, particle deposition velocity and wafer exposure time, as well as risks associated with changes in these factors, is presented. The motivation is to ultimately determine cost-effective wafer isolation technology (WIT) strategies needed to achieve the required levels of particulate contamination at the wafer surface. The means of extending the methodology to other potentially yield limiting nonparticulate airborne contaminants is also discussed.* (CC: Criteria and Standards, Identification, Measurement, and Monitoring, Modeling and Simulation)

G

Garrett, J.W., ASTM E 1559 Method for Measuring Material Outgassing /Deposition Kinetics, V. 38, No. 1, p. 19. *The American Society for Testing and Materials has published a new standard test method for characterizing time and temperature dependence of material outgassing kinetics and the deposition kinetics of outgassed species on surfaces at various temperatures The new standard uses the quartz crystal microbalance (QCM) approach. This paper describes the ASTM E 1559 test method and presents typical data. The Lockheed ASTM E 1559 test apparatus is also described.* (CC: Criteria and Standards, Identification, Measurement, and Monitoring; DTE: Criteria and Standards, Solar and Space Simulation)

Gilbert, S.L., Permeation of Moisture and Oxygen Through Polymeric O-Rings, V. 38, No. 2, p. 43. (Abstract—see Ma, C.)

Glassford, A.P.M., ASTM E 1559 Method for Measuring Material Outgassing /Deposition Kinetics, V. 38, No. 1, p. 19. (Abstract—see Garrett, J.W.)

H

Haley, B.T., Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, V. 38, No. 6, p.18. (Abstract—see Knollenberg, R.G.)

Hansen, M.D., Enhanced Multiaxis Vibration Control Using a Robust Generalized Inverse System Matrix, V. 38, No. 2, p. 36. (Abstract—see Fletcher, J.N.)

Hine, M.J., Swept Sine Vibration Test Conservatism, V. 38,

No. 6, p. 13. *The excessive overtest associated with the swept sine vibration test method was measured quantitatively using the index of conservatism and the associated overtest factor for a dynamic mass model of a typical spacecraft component. The response to a fixed amplitude sine sweep test was compared with the flight transient vibration environment for sweep rates of two, four, and six octaves/min. A response limited test was also conducted at six octave/min. The conservatism was measured using several characterizations; namely, the number of peaks exceeding, ranked peaks, shock response spectrum, shock intensity, three-dimensional shock response spectrum, and ranked peaks. Overtest factors exceeding an order of magnitude were measured for the test response with the number of peaks exceeding and three-dimensional shock response spectrum.* (DTE: Criteria and Standards, Shock and Vibration, Test Tailoring)

Hu, J M., Life Prediction and Damage Acceleration Based on the Power Spectral Density of Random Vibration, V. 38, No. 1, p. 34. *Fatigue life prediction and accelerated verification tests under a random vibration environment are important tasks for evaluating product reliability. This paper reviews the characteristics of random stress processes, discusses the methodology of life prediction and accelerated testing under various random loadings by using the stress power spectral density function obtained from finite element analysis, and develops an engineering method to determine the acceleration level and test time in reliability verification tests.* (DTE: Automotive/Transportation, Shock and Vibration, Test Tailoring, Test Time Compression; PR: Durability/Fatigue)

I

Inman, R.S., Gaseous Contaminant Measurement for Semiconductor Processing by Diode Laser Spectroscopy, V. 38, No. 5, p. 22. (Abstract—see McAndrew, J.J.F.)

J

Jain, A.K., Vibration Qualification of Commercial Computers for Use in Military Tactical Environments, V. 38, No. 4, p. 18. (Abstract—see Dente, J.V.)

Jensen, D.L., Assessing Requirements for Wafer Environment Control, V. 38, No. 6, p. 30. (Abstract—see Fosnight, W.)

Jurcik, B., Gaseous Contaminant Measurement for Semiconductor Processing by Diode Laser Spectroscopy, V. 38, No. 5, p. 22. (Abstract—see McAndrew, J.J.F.)

K

Kerrick, T.A., Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, V. 38, No. 2. p. 27. (Abstract—see Kinney, P.D.)

Kinney, P.D., Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, V. 38, No. 2. p. 27. *The nonvolatile residue monitor (NRM) operated in the batch mode has been investigated for measuring residue after evaporation (RAE) of isopropyl alcohol (IPA) and acetone. IPA, acetone, and water were doped with known concentrations of known contaminants and then measured with the NRM to determine its calibration for these liquids. The calibrations were measured with different types of contaminants and with different drying temperatures. The NRM's performance in evaluating high-purity semiconductor grade IPA and acetone was also investigated. RAE levels were measured in solvents purchased from four suppliers to the semiconductor industry.* (CC: Criteria and Standards, Identification, Measurement, and Monitoring)

Knollenberg, R.G., Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, V. 38, No. 6, p.18. *Detailed particle microcontamination measurements were made in Class 100 and Class 10 (unidirectional flow, or VLF) environments being used as final assembly and electro-optical assembly areas, respectively, at Particle Measuring Systems, Inc. Two groups of measuring instruments monitoring the two areas included four laser particle counters and three condensation nucleus counters. The utility of both types of measurements in these environments is discussed relative to sensitivity, flow rate, and background noise.* (CC: Cleanroom Operation/Procedures, Identification, Measurement, and Monitoring, Sources and Effects)

L

Lee, J.-K., Filtration of Real-World Particles in Liquids by Microporous Membrane Filters, V. 38, No. 3, p. 19. *The filtration effect of irregular-shaped, real-world particles, such as silicon, alumina, and silicon nitride particles, were experimentally investigated using 0.1, 0.22, and 0.45-μm-rated PFDF and 0.2-μm PTFE membrane filters. Particle retention tests were performed by measuring particle concentrations upstream and downstream of the test filter using an automatic liquid-borne laser particle counter. The test apparatus for the particle retention studies had a pump-driven water recirculating system.* (CC: Filters and Filtration)

Liu, B.Y.H., Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, V. 38, No. 2. p. 27. (Abstract—see Kinney, P.D.)

Liu, B.Y.H., Filtration of Real-World Particles in Liquids by Microporous Membrane Filters, V. 38, No. 3, p. 19. (Abstract—see Lee, J.-K.)

Liu, B.Y.H., Lower Detection Limit of Aerosol Particle Counters, V. 38, No. 4, p. 31. *Aerosol particle counters based on light-scattering have a broad range of applications including cleanroom monitoring, air pollution research, and pharmaceutical studies. Each application may deal with particle materials having various refractive indices. The effect of the particle refractive index on the lower detection of aerosol particle counters was investigated using the Mie theory. Counting efficiency measurements were made to verify the theoretical results. Measurements were performed with polystyrene latex, silicon, silicon nitride, and silicon dioxide particles. Two commercial aerosol counters and a condensation nucleus*

counter were used in the study. (CC: Identification, Measurement, and Monitoring)

M

Ma, C., Permeation of Moisture and Oxygen Through Polymeric O-Rings, V. 38, No. 2, p. 43. *The permeation coefficients of H_2O and O_2 through polymeric O-rings were obtained in this study. Increases of trace level impurities in an ultra-high purity nitrogen purge gas due to the permeation processes were measured using an atmospheric pressure ionization mass spectrometer (APIMS). The experimental results of nine different O-ring samples (Kalrez, Chemraz, Teflon, Vespel, Viton) are reported.* (CC: Identification, Measurement, and Monitoring, Sources and Effects)

Martin, R., Assessing Requirements for Wafer Environment Control, V. 38, No. 6, p. 30. (Abstract—see Fosnight, W.)

Mattina, C.F., A Comparison of Commercial Cleanroom Wiping Materials for Properties Related to Functionality and Cleanliness, V. 38, No. 1, p. 41. (Abstract—see Oathout, J.M.)

McAndrew, J.J.F., Gaseous Contaminant Measurement for Semiconductor Processing by Diode Laser Spectroscopy, V. 38, No. 5, p. 22. *Tunable diode laser absorption spectroscopy (TDLAS) is a tool for purity measurement in microelectronic process gases and environments. It is compatible with any matrix gas and extremely sensitive. This paper describes the application of a laboratory TDLAS instrument to measurement of CO, CO_2, and H_2O with sub-ppb sensitivity, including determination of a CO level of 0.35 ±0.2 ppb in nitrogen samples from an air separation plant. Fluid dynamic simulation was used to optimize the design of the cell used for H_2O measurement. TDLAS lends itself to the study of contamination sources in situ. As examples, measurements of CO generation in sampling vessels and of CO_2 outgassing in an electropolished stainless steel chamber are briefly discussed.* (CC: Identification, Measurement, and Monitoring)

McCutcheon, J.L., Vibration Qualification of Commercial Computers for Use in Military Tactical Environments, V. 38, No. 4, p. 18. (Abstract—see Dente, J.V.)

Medearis, K., Rational Vibration and Structural Dynamics Evaluations for Advanced Technology Facilities, V. 38, No. 5, p. 35. *This paper provides an overview of structural and mechanical vibration analyses for the design and construction of micro-electronics and other advanced technology facilities. Analyses are based on the premise that individual system elements are dynamically related to one another. The dynamic characteristics of each component must be properly represented in a "total system" analytical model to depict realistic situations. The limitations of isolation techniques are discussed, especially with regard to computer-chip-manufacturing machines ("tools") and fans. Fan design resonant speed values are usually not available from the manufacturer and thus must be calculated and evaluated for adequacy. Easy-to-use displacement response vs. static stiffness plots are presented for use in preliminary design. These plots define criteria that facilitate optimizing floor framing structural systems and minimizing associated costs.* (CC: Cleanroom Design/Materials; DTE: Criteria and Standards, Shock and Vibration)

Miller, R.J., SEMATECH Minienvironment Benchmarking Project, V. 38, No. 3, p. 36. (Abstract—see Rothman, L.B.)

O

Oathout, J.M., A Comparison of Commercial Cleanroom Wiping Materials for Properties Related to Functionality and Cleanliness, V. 38, No. 1, p. 41. *Using published procedures, 10 commercially available wiping materials were tested and evaluated for characteristics related to functionality and contamination. Particles are reported as readily releasable particles, those easily removed from wipers using water, and as particles generated in response to the administration of frictional energy. Data are also provided for extractible matter with two solvents, water and 2-propanol, and for the total mass of inorganic matter as measured by the level of high-temperature ash. The data related to contamination cover several orders of magnitude and are reported not only per unit area and per unit mass but also on the basis of unit of filth per unit of function.* (CC: Identification, Measurement, and Monitoring, Sources and Effects)

P

Pecht, M., Physics-of-Failure: An approach to Reliable Product Development, V. 38, No. 5, p. 30. *Reliability assessments based on physics-of-failure methods incorporate reliability into the design process to prevent parts from failing in service. An understanding of the physics-of-failure is necessary in applications that afford little opportunity for testing, or for reliability growth. This paper presents an overview of physics-of-failure and a case study of the application of physics-of-failure to a specific failure mechanism called conductive filament formation.* (DTE: Climatics and Thermal; PR: Durability/Fatigue, Stress Screening)

Periasamy, R., Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, V. 38, No. 1, p. 29. *Particle emission rates measured from ultrahigh purity, cleanroom gas handling components following the test procedures specified in the SEMATECH test methods are described. Particle contribution data obtained for fresh out-of-the-bag, stainless steel test samples, 1/4 in. in OD, from different manufacturers are summarized in this paper.* (CC: Criteria and Standards, Identification, Measurement, and Monitoring, Sources and Effects)

Peters, S.M., Particle Fallout in a Class 100,000 High-Bay Aerospace Cleanroom, V. 38, No. 4, p. 15. *Cleanrooms are certified to a particular class by measuring the airborne particle count. However, the aerospace industry is generally more interested in particles larger than those detected by an airborne particle counter. The amount of large particles is generally measured with fallout plates.*

The Boeing Company has used a Class 100,000 high-bay cleanroom for processing aerospace hardware. Although the cleanroom has consistently met Class 100,000 airborne particulate requirements, larger particle fallout has varied substantially in the room. Approximately 4 yr of fallout data have been collected. By tracking fallout, it was possible to detect actions that either positively or adversely affected the fallout rate. The fallout data, the variables affecting the fallout rate, the type of fallout, and the measurement methodology are presented. (CC: Cleanroom Operation/Procedures, Identification, Measurement, and Monitoring, Sources and Effects; DTE: Solar and Space Simulation)

Pui, D.Y.H., Evaluation of a Nonvolatile Residue Monitor for Measurement of Residue after Evaporation of IPA and Acetone, V. 38, No. 2, P. 27. (Abstract—see Kinney, P.D.)

R

Riddle, J., Particle Emissions from Gas Handling Components Measured According to the SEMATECH Test Methods, V. 38, No. 1, p. 29. (Abstract—see Periasamy, R.)

Rothman, L.B., SEMATECH Minienvironment Benchmarking Project, V. 38, No. 3, p. 36. *A thin films fabrication facility using minienvironments and product-handling automation was benchmarked to determine the extent to which isolating products from the cleanroom avoids contamination. Data were collected from tests that simulated production conditions while controlling random variables. In addition, the study investigated reliability, electrostatic charge and electromagnetic interference issues, and materials outgassing.* (CC: Cleanroom Operation/Procedures)

Rubow, K.L., Filtration of Real-World Particles in Liquids by Microporous Membrane Filters, V. 38, No. 3, p. 19. (Abstract—see Lee, J.-K.)

S

Shadman, F., Permeation of Moisture and Oxygen Through Polymeric O-Rings, V. 38, No. 2, p. 43. (Abstract—see Ma, C.)

Shero, E., Permeation of Moisture and Oxygen Through Polymeric O-Rings, V. 38, No. 2, p. 43. (Abstract—see Ma, C.)

Silverman, S., SEMATECH Minienvironment Benchmarking Project, V. 38, No. 3, p. 36. (Abstract—see Rothman, L.B.)

Steakley, J.M., ASTM E 1559 Method for Measuring Material Outgassing /Deposition Kinetics, V. 38, No. 1, p. 19. (Abstract—see Garrett, J.W.)

Steidtmann, D.E., Effects of Instrument Flow Rate, Sensitivity, and Background Noise on Cleanroom Particle Count Statistics, V. 38, No. 6, p. 18. (Abstract—see Knollenberg, R.G.)

T

Tilford, C.R., Partial Pressure Analysis in Space Testing, V. 38, No. 3, p. 30. *For vacuum-system or test-article analysis, it is often desirable to know the species and partial pressure of the vacuum gases. Residual gas or partial pressure analyzers are commonly used for this purpose. These instruments can be extremely useful, but they should be used with care. Depending on the design, calibration procedures, and conditions of use, measurements can be accurate to within a few percent, or in error by two or more orders of magnitude. For most instruments these errors can be greatly reduced with proper operating procedures and conditions of use. Data are presented showing performance characteristics for different instruments and gases. Operating parameters are recommended to minimize some errors. Calibration procedures are described that can detect and correct other errors.* (CC: Identification, Measurement, and Monitoring; DTE: Solar and Space Simulation)

V

Verma, N., Permeation of Moisture and Oxygen Through Polymeric O-Rings, V. 38, No. 2, p. 43. (Abstract—see Ma, C.)

Vold, H., Enhanced Multiaxis Vibration Control Using a Robust Generalized Inverse System Matrix, V. 38, No. 2, p. 36. (Abstract—see Fletcher, J.N.)

W

Wang, R.D., SEMATECH Minienvironment Benchmarking Project, V. 38, No. 3, p. 36. (Abstract—see Rothman, L.B.)

Y

Yoo, S.-H., Filtration of Real-World Particles in Liquids by Microporous Membrane Filters, V. 38, No. 3, p. 19. (Abstract—see Lee, J.-K.)

Yoo, S.-H., Lower Detection Limit of Aerosol Particle Counters, V. 38, No. 4, p. 31. (Abstract—see Liu, B.Y.H.)

Yowell, L., On-Site Prediction of Overstress in an Aircraft Munitions Carrier, V. 38, No. 3, p. 26. *Vibration and strain data were measured on a modified munitions trailer to ensure that the design strength criteria had not been exceeded. These data were used in conjunction with a computer model to determine if the stress levels were sufficiently low to allow adequate fatigue life without further modification to the trailer. By combining standard data verification techniques with a stress prediction technique, data from a number of channels were reviewed at the test site to determine the severity of measured levels. This information was used to control the test process.* (DTE: Automotive/Transportation, Shock and Vibration; PR: Durability/Fatigue) ●